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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,915	04/12/2004	Takaharu Yamano	300.1152	2431
21171	7590	08/09/2007		
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			EXAMINER VU, HUNG K	
			ART UNIT	PAPER NUMBER
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			08/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/821,915

Applicant(s)

YAMANO ET AL.

Examiner

Hung Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10 and 19-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 19-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 07/03/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 07/03/07 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 19-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 19, lines 2-6, the phrase “a substrate and a non-device pattern surface formed on one side of the substrate and a non-device pattern surface formed on an opposing side of the substrate” is unclear as to how the substrate having non-device pattern surfaces.

In claim 19, lines 7-9, the phrase “an insulator bonding layer interposed between the non-device pattern surface of one semiconductor layer and the device pattern surface of an adjacent semiconductor layer” is unclear as to where “one semiconductor layer” and “an adjacent semiconductor layer” are located in relate to the semiconductor package.

In claim 19, last two lines, the phrase “a heat radiation layer bonded to the electrically insulating layer” is unclear as to where “the electrically insulating layer” is located in relation to the semiconductor package.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al. (PN 6,713,856, of record) in view of Marrs (PN 5,482,898).

Tsai et al. discloses, as shown in Figures 2-3, a semiconductor package, wherein

the semiconductor package (10) is a stacked body formed by bonding two or more semiconductor devices (20&34,56&58) through an insulating layer (30,60);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device faces a non-device pattern surface of a semiconductor device stacked on the lower semiconductor device;

the semiconductor device positioned, in sequence, as a lowermost semiconductor device and further comprising a back surface protective film and a heat radiation layer of a material

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having a high heat transfer rate, on the none-device pattern surface of the lowermost semiconductor device,

the back surface protective film is bonded to a back surface of the stacked body.

Tsai et al. does not disclose the back surface protective film is an insulating epoxy resin film.

However, Marrs discloses a package having an adhesive film (115) between a semiconductor device (106) and a heat radiation layer (101), can be conductive film or an insulating film which also is epoxy resin film. Note Figures 1A-4B and Col. 5, line 61 – Col. 6, line 6 of Marrs.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the back surface protective film of Tsai et al. being an insulating epoxy resin film, such as taught by Marrs since a conductive film and an insulative epoxy resin film are commonly used as the adhesive film and they are interchangeable.

Note that the terms “obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete semiconductor packages” and “by bonding” are method recitation in a device claimed.

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

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Regarding claim 3, Tsai et al. and Marrs disclose the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term “before said semiconductor packages are diced” is method recitation in a device claimed.

Regarding claim 4, Tsai et al. and Marrs disclose the heat radiation layer is one of a thin film. Note that the term “formed by a thin film formation technology” is method recitation in a device claimed.

Regarding claim 5, Tsai et al. and Marrs disclose the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Tsai et al. and Marrs disclose the heat radiation layer also acts as a support.

Regarding claim 7, Tsai et al. and Marrs disclose the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Tsai et al. and Marrs disclose the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer on the device pattern surface thereof, and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer. Note that the term “before said semiconductor package is dice” is method recitation in a device claimed.

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4. Claims 1 and 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (PN 5,627,106, of record) in view of Yoshihiro et al. (JP5-41478, of record).

Hsu discloses, as shown in Figure 12, a semiconductor package, wherein

the semiconductor package is a stacked body formed by bonding two or more semiconductor devices (40,10) through an insulating layer (30,50);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device (40) faces a non-device pattern surface of a semiconductor device (10) stacked on the lower semiconductor device.

Hsu does not disclose the semiconductor device (40) further comprises a back surface protective film and a heat radiation layer of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device, wherein the back surface protective film is an epoxy resin film. However, Yoshihiro et al. discloses a semiconductor device comprises a back surface protective film (25) and a heat radiation layer (11a) of a material having a high heat transfer rate, on the none-device pattern surface of the lowermost semiconductor device, wherein the protective film is also an epoxy resin film. Note Figures 1-6 of Yoshihiro et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the semiconductor device of Hsu having a back surface protective film and a heat radiation layer on the non-device pattern surface on the semiconductor device, such as taught by Yoshihiro et al. in order to reduce the heat build-up from the semiconductor device.

Note that the term "obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete

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semiconductor packages” is method recitation in a device claimed. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 3, Hsu and Yoshihiro et al. disclose the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term “before said semiconductor packages are diced” is method recitation in a device claimed.

Regarding claim 4, Hsu and Yoshihiro et al. disclose the heat radiation layer is one of a thin film. Note that the term “formed by a thin film formation technology” is method recitation in a device claimed.

Regarding claim 5, Hsu and Yoshihiro et al. disclose the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Hsu and Yoshihiro et al. disclose the heat radiation layer also acts as a support.

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Regarding claim 7, Hsu and Yoshihiro et al. disclose the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Hsu and Yoshihiro et al. disclose the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer (27) on the device pattern surface thereof, and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer. Note that the term “before said semiconductor package is dice” is method recitation in a device claimed.

Regarding claim 9, Hsu and Yoshihiro et al. disclose the device patterns of the semiconductor devices stacked are electrically connected to one another through a rewiring layer and a substrate through-electrode (26,20,46) that formed in one semiconductor device. Note that the term “are simultaneously formed in one semiconductor device” is method recitation in a device claimed.

Regarding claim 10, Hsu and Yoshihiro et al. disclose all of the claimed limitations except material of the re-wiring layer and the substrate through-electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the re-wiring layer and the substrate through-electrode of Hsu and Yoshihiro et al. having the materials as that claimed by Applicant, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Response to Arguments

5. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Monday to Thursday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on (571) 272 - 1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vu

August 3, 2007

A handwritten signature in black ink, appearing to read 'Hung Vu', written over a horizontal line.

Hung Vu

Primary Examiner